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Supplement I to
Marketing Research Report No. 324

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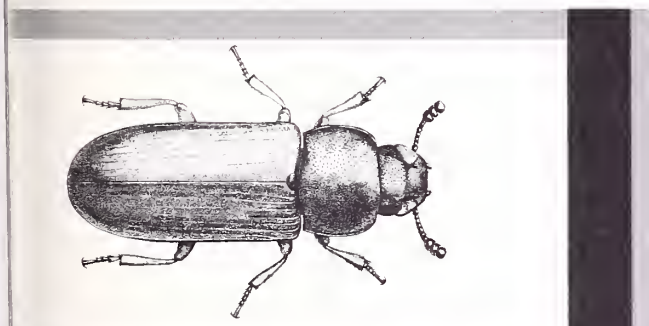
Supplement I to Laboratory Evaluation of Promising Compounds as Repellents to Flour Beetles, Tribolium Spp.



Market Quality Research Division
Agricultural Marketing Service
U. S. DEPARTMENT OF AGRICULTURE

WARNING

Except for pyrethrum, none of the chemicals discussed in this report has been approved by the Federal Food and Drug Administration for use as an insect repellent on packages for food. None of the chemicals may be so used unless the Food and Drug Administration approves such use.

The findings reported here are exclusively for the use of scientists seeking effective repellents for insects. After the best repellents have been determined, the Food and Drug Administration may determine the maximum rate at which such repellents may be used with safety to consumers, or it may determine that some of them cannot be safely used, or, possibly, that none of them may be used.

PREFACE

This report is a supplement to Marketing Research Report 324. It covers the laboratory evaluation of 450 additional compounds as insect repellents for possible use in the development of insect-resistant packages for food, feed, fiber, and other agricultural commodities. The evaluation of new compounds is being continued, and the results will be published in similar supplements. The study is a part of a broad research program of the Agricultural Marketing Service designed to improve market quality and to reduce costs of marketing farm products.

Richard H. Guy, working under the general direction of Dean F. Davis, leader of the AMS research station at Savannah, conducted the laboratory work and assembled and tabulated the performance data on the chemicals included in this supplemental report. He was assisted in the laboratory work by Charles E. Metts.

An evaluation program, such as that described in this report, could not be conducted without the chemical synthesis programs of Government and industry laboratories. Compounds designated with an asterisk (*) in the appendix were synthesized by chemists of the Pesticide Chemicals Research Branch, Agricultural Research Service: B. H. Alexander, W. F. Barthel, M. Beroza, R. T. Brown, S. I. Gertler, E. T. McCabe, and T. Oda.

All chemicals are named by the Chemical Abstracts system of nomenclature. Because some of the compounds are so old and of unknown origin, their compositions (and names) are regarded as somewhat uncertain. The naming and indexing of the compounds was done by E. M. Osborne, Pesticide Chemicals Research Branch.

Washington, D. C. February 1964

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SUMMARY

This report presents the results of preliminary laboratory evaluation tests made with 450 experimental compounds to determine their efficacy as repellents to stored-product insects.

Thirty-nine of the compounds produced repellency comparable with that produced by a standard pyrethrum treatment.

The studies were part of the research program to develop insect-resistant packaging; specifically, to find materials for package treatment other than pyrethrum, the only chemical approved for this purpose at present by the Food and Drug Administration.

These experimental compounds were evaluated as described in MRR-324. The insects were 3- to 28-day-old adults from a mixed culture of confused flour beetles, Tribolium confusum Duv., and red flour beetles, T. castaneum (Hbst.). In previous work, these two species responded identically within the limits of these tests. Paper treated with synergized pyrethrum at the rate of 10 mg. of pyrethrins and 100 mg. of piperonyl butoxide per square foot was the standard for comparison in all tests.

Supplement I to Laboratory Evaluation of Promising Compounds as Repellents to Flour Beetles, Tribolium Spp.

Stored-Product Insects Laboratory
Savannah, Ga.[1]

INTRODUCTION

An important part of the research on development of insect-resistant packaging conducted by the Stored-Product Insects Branch, Agricultural Marketing Service, is the search for new insect repellents that are less expensive and longer lasting than pyrethrum.[2] Synergized pyrethrum is the only insecticide approved by the Food and Drug Administration for application to food packages. This country depends on foreign sources for its supply of pyrethrum, and the material is very expensive, has a relatively short life, and is difficult to detect by chemical analysis.

A continuous phase of this research project on the development of insect-resistant packaging is the preliminary evaluation of experimental compounds to determine their efficacy as repellents against stored-product insects. The materials are obtained from various sources, primarily from the synthesis program of the Beltsville, Md., laboratory of the Pesticide Chemicals Research Branch, Agricultural Research Service; the Orlando, Fla., laboratory on Insects Affecting Man Investigations, ARS; and various companies in the pesticide chemicals industry. Only those compounds that have already shown some promise as repellents in previous tests or are structurally related to promising repellents are included in the tests conducted at Savannah.

This report presents the results of tests on compounds evaluated since the publication of Marketing Research Report No. 324 and up to June 1960. During this period, 450 compounds were tested. These compounds, with the 534 compounds reported on in Marketing Research Report No. 324, make a total of 984 compounds evaluated for repellency.

PROCEDURE

The laboratory technique used in the evaluation of these experimental compounds consisted of confining adults, 3 to 28 days old, from mixed cultures containing the confused flour beetle, Tribolium confusum Duv., and the red flour beetle, T. castaneum (Herbst), on an arena composed of equal areas of treated and untreated paper, and determining the average deviation from an established normal distribution of the insects on an untreated arena over a period of 5 days. This method has been described in more detail by Laudani, Davis, and Swank.[3] In previous studies, T. confusum and T. castaneum responded identically within limits of these tests. The repellency tests were conducted beginning 4 days, 2 weeks, and 1, 2, and 3 months after the compounds were applied to the paper. All tests were conducted in a room maintained at a constant temperature of

[1] This is one of the field stations of the Stored-Product Insects Branch, Market Quality Research Division, Agricultural Marketing Service, U.S. Department of Agriculture.

[2] Laudani, Hamilton, and Davis, Dean F. The Status of Federal Research on the Development of Insect-Resistant Packages. Tappi 38(6):322-326. 1955.

[3] Laudani, Hamilton, Davis, D. F., and Swank, G. R. A Laboratory Method of Evaluating the Repellency of Treated Paper to Stored-Product Insects. Tappi 38(6):336-341. 1955.

80° ± 2° F. and a relative humidity of 60 percent ± 5. Between aging tests, the papers were stored in open-end folders in a manner that avoided contamination of the treated sheets.

Untreated papers (checks) and papers treated with a combination of pyrethrum and piperonyl butoxide at 10 and 100 mg. per square foot were included in the tests as standards for comparison.

EVALUATION OF RESULTS

The percentage value shown in the appendix for each of the treatments represents the average number of test insects counted on the untreated half of the repellency arena during the initial and the four aging-test periods. The figures for the untreated part of the arena were presented in order that high values would be associated with greater repellency. These figures have been converted to express percent repellency or attractancy by doubling the difference between the percentage of insects counted on the untreated half and the 50-percent expected distribution. The positive figures (+) express repellency and the negative figures (-) attractancy.

Many of the 450 compounds were evaluated at several rates of application. Each rate of application was considered an entity, and for each the percent repellency value and classification were designated. Based on this method of treating the results of these evaluation tests, the number of treatments assigned to each of the repellency categories was:

Class	Repellency (Percent)	Treatments (Number)
0	None	374
I	0.1 to 20	490
II	20.1 to 40	314
III	40.1 to 60	124
IV	60.1 to 80	39
V	80.1 to 100	0

The standard used for comparison falls in the Class IV category, according to this test method. Thirty-nine of the experimental treatments evaluated produced repellent action comparable to that produced by the standard. The 10 most effective of these treatments were (in order of decreasing average percentage of repellency for the combined initial and aging test periods):

Item number	Compound	Rate of application Mg./sq. ft.
433	alpha, alpha, alpha-Trifluoro-2-nitro-p-toluidine	200
365	N-Propylphthalimide	200
416	N-Hexylsuccinimide	200
420	N-Octylsuccinimide	200
357	N-Ethylphthalimide	200
409	sec-Butyl N, N-diethylsuccinamate	200
361	N-Methylphthalimide	200
433	alpha, alpha, alpha-Trifluoro-2-nitro-p-toluidine	100
94	p-Tolyl benzoate	200
361	N-Methylphthalimide	100

When average repellency is determined from all five tests, high initial values of some chemicals may overshadow the effectiveness of other compounds that produce repellency for a longer time. To overcome this, the 10 most effective treatments, based on data from the 1-, 2-, and 3-month tests and omitting the two earlier tests, were determined as follows:

Item number	Compound	Rate of application Mg./sq. ft.
420	N-Octylsuccinimide	200
409	sec-Butyl N, N-diethylsuccinamate	200
94	p-Tolyl benzoate	200
416	N-Hexylsuccinimide	200
365	N-Propylphthalimide	200
148	Trimethylene crotonate	200
420	N-Octylsuccinimide	100
52	m-Nitro-benzaldehyde	25
433	alpha, alpha, alpha-Trifluoro-2-nitro-p-toluidine	200
357	N-Ethylphthalimide	200

Seven of the compounds appear in both listings. N-Octylsuccinimide, N-propylphthalimide, and N-hexylsuccinimide were the most effective compounds tested after the treatments had aged 3 months.

Interest in insect attractants has increased sharply. The test technique used in this work also gives an indication of the attractancy of a chemical. In the tabulation of results, negative percentage values show that the flour beetle adults were attracted to the treated surface, the higher negative values indicating greater attractancy. Based on this interpretation of the results, the following compounds, listed in alphabetical order, were designated the most effective attractants.

Item number	Compound
77	Benzene, 4-allyl-5-isopropoxy-1, 2-methylenedioxy-
79	Benzene, 4-allyl-1, 2-methylenedioxy-5-propoxy-
83	Benzene, 5-bromo-1, 2-methylenedioxy-4-propyl-
85	Benzene, 4-isopropoxy-5-(2-methylallyl)-1, 2-methylenedioxy-
86	Benzene, 4-methoxy-5-(2-methylallyl)-1, 2-methylenedioxy-
112	Butyric acid, 1, 2, 3, 4-tetrahydro-2-naphthyl ester
168	Cyclohexanol, 2-(2, 5-xylyl)-, trans-
270	2-Hexenal, 2-ethyl-
303	p-Menthane-2, 3-diol
366	Piperidine, 1-benzoyl-

The Department of Agriculture intends to publish progressive supplementary reports of the results of the program on preliminary evaluation of the repellency of experimental chemical compounds to stored-product insects.

APPENDIX

Chemicals Tested and Results of Tests

Item No.	Ent-No.[1]	Chemical name[2]	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
1	2060	Acetamide	25	-14.4	0
			100	-28.8	0
			200	-18.2	0
2	14253	Acetamide, N-allyl-2-butoxy-	25	2.6	I
			100	6.6	I
			200	24.3	II
3	16737	Acetamide, N-cyclohexyl-N-propyl-	10	16.1	I
4	16751	Acetamide, N-cyclohexyl-N-tetrahydrofurfuryl-	25	-12.1	0
			100	-14.4	0
			200	31.4	II
5	*1015	Acetamide, N,N-dipentyl-	25	51.2	III
			100	44.3	III
			200	48.6	III
6	*21864	Acetamide, 2-(2-ethoxy=ethoxy)-N-isobutyl-	25	9.4	I
			100	5.9	I
			200	34.3	II
7	7705	Acetamide, N-isobutyl-2-(phenethyloxy)-	25	54.7	III
			100	61.3	IV
			200	65.2	IV
8	*2832	Acetamide, N-pentyl-	10	2.4	I
			25	-14.2	0
			100	4.2	I
			200	2.4	I
9	1045	Acetanilide	25	-1.4	0
			100	-1.6	0
			200	1.2	I
10	509	Acetanilide, 4'-chloro-	25	-0.7	0
			100	16.8	I
			200	7.8	I
11	5528	Acetanilide, N-isopentyl-	25	11.6	I
			100	3.9	I
			200	8.1	I

[1] Code number assigned by Entomology Research Division, Agriculture Research Service, to compounds distributed for screening. An asterisk (*) identifies those compounds synthesized by chemists of the Pesticide Chemicals Research Branch, ERD, ARS.

[2] Single hyphens in these names should be used as shown; double hyphens indicate that the words should be closed up if written consecutively.

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
12	*3341	Acetanilide, N-isopropyl-	25	10.4	I
			100	19.9	I
			200	25.0	II
13	4343	Acetic acid, chloro-, 2-methyl-2-nitro= propyl ester	25	3.7	I
			100	12.1	I
			200	15.0	I
14	4322	Acetic acid, phenoxy-, isopropyl ester	25	6.0	I
			100	5.8	I
			200	9.0	I
15	4318	Acetic acid, phenoxy-, methyl ester	25	-11.4	0
			100	-0.9	0
16	2540	Acetoacetic acid, 2-(2-butoxyethoxy)ethyl ester	25	0.1	I
			100	22.3	II
			200	32.7	II
17	11089	Acetoacetic acid, ethyl ester, oxime acetate	25	6.6	I
			100	-3.2	0
			200	9.1	I
18	*6231	Acetoacetic acid, phenethyl ester	25	33.8	II
			50	28.4	II
			100	39.2	II
			200	42.4	III
19	1029	Acetophenone, 4'-ethoxy-	25	-28.2	0
			100	-23.1	0
			200	-26.6	0
20	*10570	Acetophenone, 2-hydroxy-, acetate	25	17.9	I
			100	15.8	I
			200	36.3	II
21	227	Acetophenone, 4'-methoxy-	25	-27.6	0
			100	-18.7	0
			200	4.1	I
22	10516	Acetophenone, 4'-methoxy-3'-methyl-	10	17.8	I
			25	15.4	I
			100	24.6	II
			200	42.6	III
23	2242	Acetophenone, 3'-nitro-	25	42.7	III
			100	53.8	III
			200	60.1	IV
24	11167	Acetophenone, x',x',x'-triethyl-2-phenyl-	10	-1.8	0
25	*5003	Acetylsalicylic acid, ethyl ester	25	-30.7	0
			100	-27.4	0
			200	-29.1	0

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
26	3190	Acrylic acid, 2-(2-methoxy=ethoxy)ethyl ester	25	9.1	I
			100	19.7	I
27	2886	Acrylic acid, 2-methyl-2-nitro=propyl ester	25	17.8	I
			100	18.6	I
			200	6.3	I
28	23778	Acrylic acid, 2-cyano-3-ethoxy-, ethyl ester	25	-36.2	0
			100	-15.2	0
			200	7.1	I
29	671	Adipic acid, dibutyl ester	25	-10.6	0
			100	50.2	III
			200	59.1	III
30	6052	Adipic acid, dipropyl ester	25	2.3	I
			100	-0.8	0
			200	34.6	II
31	15307	Aniline, N-butyl-	10	-4.8	0
32	15995	o-Anisic acid, butyl ester	10	16.3	I
33	680	o-Anisic acid, methyl ester	10	23.3	II
			25	12.7	I
			100	7.5	I
			200	14.6	I
34	893	p-Anisic acid	25	-10.4	0
			100	11.8	I
			200	6.2	I
35	6107	p-Anisic acid, isobutyl ester	25	16.0	I
			50	5.8	I
			100	14.2	I
			200	34.2	II
36	229	p-Anisic acid, methyl ester	25	-4.6	0
			50	-2.9	0
			100	-9.2	0
			200	-5.0	0
37	*6075	p-Anisic acid, propyl ester	25	-4.2	0
			100	-5.2	0
			200	-11.8	0
38	2392	p-Anisidine	25	5.1	I
			100	-1.5	0
			200	5.6	I
39	189	Anisole, p-nitro-	25	-13.0	0
			100	5.4	I
			200	16.2	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
40	11801	p-Anisonitrile	25	-7.7	0
			100	-1.0	0
			200	-0.3	0
41	1170	Anisyl alcohol	10	18.8	I
			25	13.9	I
			100	18.8	I
			200	19.8	I
42	2941	Anisyl alcohol, formate	25	-1.5	0
			100	15.2	I
			200	22.8	II
43	9427	Anisyl alcohol, alpha-ethyl-	10	-5.0	0
44	5520	Anisyl alcohol, alpha-methyl-	25	6.4	I
			100	-1.1	0
			200	18.1	I
45	*2577	Anthranilic acid, isopropyl ester	25	-17.0	0
			100	-2.0	0
			200	0.4	I
46	*2576	Anthranilic acid, propyl ester	25	3.5	I
			100	8.4	I
			200	35.7	II
47	10574	Benzaldehyde, oxime	10	6.0	I
48	5684	Benzaldehyde, p-ethoxy-	25	12.4	I
			100	-16.4	0
			200	0.3	I
49	786	Benzaldehyde, 3-ethoxy-4-hydroxy-	25	22.4	II
			100	34.8	II
			200	39.1	II
50	*5868	Benzaldehyde, o-(hexyloxy)-	25	-11.8	0
			100	-23.0	0
			200	17.7	I
51	*5768	Benzaldehyde, o-(isopentyloxy)-	25	-26.6	0
			100	-15.1	0
			200	26.8	II
52	8906	Benzaldehyde, m-nitro-	25	71.0	IV
			100	69.1	IV
			200	63.4	IV
53	5518	Benzaldehyde, p-propoxy-	25	5.4	I
			100	12.6	I
			200	25.9	II

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
54	1031	Benzamide	25	2.8	I
			100	13.2	I
			200	23.6	II
55	9664	Benzamide, o-chloro-	25	16.8	I
			100	22.5	II
			200	23.6	II
56	9668	Benzamide, p-chloro-	25	7.6	I
			100	21.1	II
			200	21.9	II
57	*14147	Benzamide, o-chloro-N,N-diethyl-	25	5.1	I
			100	11.1	I
			200	37.1	II
58	*14756	Benzamide, p-chloro-N,N-diisobutyl-	25	6.2	I
			100	14.7	I
			200	27.2	II
59	*14145	Benzamide, o-chloro-N,N-dimethyl-	25	30.5	II
			100	29.4	II
			200	49.0	III
60	*14753	Benzamide, p-chloro-N,N-dipropyl-	25	9.2	I
			100	-7.8	0
			200	-5.7	0
61	*9667	Benzamide, o-chloro-N-ethyl-	25	15.1	I
			100	36.0	II
			200	18.7	I
62	*14064	Benzamide, o-chloro-N-isobutyl-	25	23.7	II
			100	3.2	I
			200	12.2	I
63	*14059	Benzamide, o-chloro-N-isopropyl-	25	20.1	II
			100	15.6	I
			200	34.9	II
64	*9766	Benzamide, 2,4-dichloro-	25	20.2	II
			100	13.9	I
			200	27.7	II
65	*9769	Benzamide, 3,4-dichloro-	25	-1.2	0
			100	15.2	I
			200	21.0	II
66	*15265	Benzamide, 2,4-dichloro-N,N-diethyl-	25	14.2	I
			100	11.0	I
			200	32.6	II

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
67	*14979	Benzamide, 3,4-dichloro-N,N-diethyl-	25	13.2	I
			100	2.5	I
			200	23.8	II
68	*14988	Benzamide, 3,4-dichloro-N,N-diisobutyl-	25	28.2	II
			100	42.7	III
			200	42.0	III
69	*14983	Benzamide, 3,4-dichloro-N,N-diisopropyl-	25	18.2	I
			100	23.9	II
			200	49.9	III
70	*4003	Benzamide, N,N-diethyl-m-nitro-	25	12.5	I
			100	31.2	II
			200	52.3	III
71	*4369	Benzamide, N,N-diisopropyl-m-nitro-	25	28.8	II
			100	45.1	III
			200	54.9	III
72	*1462	Benzamide, N,N-dimethyl-	10	29.6	II
			25	27.0	II
			100	8.4	I
			200	21.4	II
73	*1016	Benzamide, N-pentyl-	25	11.4	I
			100	31.4	II
			200	44.8	III
74	*14226	Benzanilide, 2-chloro-3'-nitro-	25	17.5	I
			100	17.5	I
			200	28.6	II
75	*14227	Benzanilide, 2-chloro-4'-nitro-	25	15.0	I
			100	15.4	I
			200	13.3	I
76	*15206	Benzanilide, 3,4,4'-trichloro-	25	1.3	I
			100	10.3	I
			200	35.5	II
77	*31251	Benzene, 4-allyl-5-ethoxy-1,2-methylene=dioxy-	25	-43.2	0
			100	-42.9	0
78	*31259	Benzene, 4-allyl-5-isopropoxy-1,2-methylenedioxy-	25	-45.3	0
			100	-53.4	0
			200	-38.1	0
79	*31252	Benzene, 4-allyl-1,2-methylenedioxy-5-propoxy-	25	-40.4	0
			100	-48.0	0

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
80	*31248	Benzene, 4-allyl-1,2-methylenedioxy-5-(2-propynyloxy)-	25	-19.3	0
			100	-7.7	0
			200	16.7	I
81	23451	Benzene, 2-(allyloxy)-1,3-dimethoxy-	25	-15.6	0
			100	-22.4	0
			200	-18.9	0
82	1803	Benzene, 1-bromo-2,4-dinitro-	25	43.9	III
			100	48.2	III
			200	56.5	III
83	*31255	Benzene, 5-bromo-1,2-methylenedioxy-4-propyl-	25	-38.4	0
			100	-51.2	0
			200	-41.3	0
84	2913	Benzene, m-dinitro-	25	43.6	III
			50	48.0	III
			100	64.2	IV
			200	65.2	IV
85	*31267	Benzene, 4-isopropoxy-5-(2-methylallyl)-1,2-methylenedioxy-	25	-47.6	0
			100	-48.1	0
			200	-49.1	0
86	*31249	Benzene, 4-methoxy-5-(2-methylallyl)-1,2-methylenedioxy-	25	-50.6	0
			100	-51.6	0
87	*31262	Benzene, 4-methoxy-1,2-methylenedioxy-5-propenyl-	25	-44.7	0
			100	-40.0	0
			200	-22.3	0
88	*31253	Benzene, 4-(2-methylallyloxy)-1,2-methylenedioxy-	25	-42.4	0
			100	-23.5	0
			200	-23.4	0
89	2525	Benzene, tetrachloro(ethyl)-	25	11.7	I
			100	8.4	I
			200	20.3	II
90	8090	1,3-Benzodioxan-4-one, 2-methyl-	25	-5.2	0
			100	18.2	I
			200	-1.7	0
91	523	Benzoic acid, benzyl ester	25	-2.3	0
			100	0.6	I
			200	56.8	III
92	2064	Benzoic acid, hexyl ester	25	-19.1	0
			100	10.9	I
			200	13.9	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
93	*1966	Benzoic acid, isopentyl ester	25	-16.3	0
			100	-18.0	0
			200	7.6	I
94	1805	Benzoic acid, p-tolyl ester	25	14.0	I
			100	49.8	III
			200	73.1	IV
95	5085	Benzoic acid, o-acetyl-, methyl ester	25	-2.9	0
			100	-25.6	0
			200	-2.9	0
96	*5007	Benzoic acid, o-ethoxy-, methyl ester	25	-30.6	0
			100	-35.6	0
			200	-36.4	0
97	488	Benzonitrile, p-bromo-	25	-4.2	0
			50	5.9	I
			100	7.6	I
			200	3.9	I
98	11017	Benzyl alcohol, p-bromo-alpha-methyl-	10	-1.4	0
99	5757	Benzyl alcohol, o-sec-butoxy-	25	-4.1	0
			100	13.0	I
			200	10.1	I
100	5521	Benzyl alcohol, o-methoxy-	25	-0.3	0
			100	8.8	I
			200	-2.4	0
101	8109	Benzyl alcohol, alpha-methyl-, benzoate	25	18.2	I
			100	58.7	III
			200	57.8	III
102	16756	Benzylamine, N-cyclohexyl-N-ethyl-	10	12.3	I
103	2269	Benzyl ether	25	-4.4	0
			100	30.9	II
			200	53.4	III
104	8298	2,2'-Bi-m-dioxane, 5,5'-diethyl-4,4'-dipropyl-	10	-15.6	0
105	11558	1-Butanol, 3-phenyl-	25	7.2	I
			100	15.9	I
			200	7.8	I
106	10037	3-Buten-2-ol, 4-phenyl-	10	12.8	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
107	944	3-Buten-2-one, 4-phenyl-	10	-2.9	0
			25	7.4	I
			100	15.9	I
			200	3.8	I
108	15130	Butyramide, N-hexyl-	10	5.0	I
109	5853	Butyric acid, 2-ethyl-3-hydroxyhexyl ester	25	-7.4	0
			100	-0.2	0
			200	4.0	I
110	*2954	Butyric acid, phenethyl ester	25	14.2	I
			100	12.4	I
			200	8.8	I
111	6152	Butyric acid, 3-phenylpropyl ester	25	19.4	I
			100	22.8	II
			200	25.8	II
112	5854	Butyric acid, 1,2,3,4-tetrahydro-2-naphthyl ester	25	-63.4	0
			100	-66.2	0
			200	-53.1	0
113	*23169	Butyric acid, 2-bromo-, tetrahydrofurfuryl ester	25	11.2	I
			100	14.4	I
			200	9.7	I
114	7227	Butyric acid, 2,3-epoxy-2-methyl-3-phenyl-, propyl ester	25	24.3	II
			100	29.9	II
			200	40.8	III
115	23093	Butyrophenone, oxime	25	8.0	I
			100	12.2	I
			200	26.1	II
116	10540	Butyrophenone, 2-hydroxy-, acetate	10	2.2	I
117	16341	Carbamic acid, dimethyl-, phenethyl ester	10	9.1	I
118	16336	Carbamic acid, methyl-, benzyl ester	25	25.2	II
			100	26.9	II
			200	33.2	II
119	*14989	Carbonic acid, di-o-tolyl ester	25	-11.4	0
			100	27.7	II
			200	55.0	III
120	1514	Carvacrol	25	0.6	I
			100	20.2	II
			200	27.0	II

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
121	23057	Chavicol, 2,6-dimethoxy-	25	23.9	II
			100	31.1	II
			200	45.2	III
122	*21422	Chrysanthemumic acid, m-(allyloxy) benzyl ester	10	-2.0	0
			25	34.6	II
			50	19.5	I
			100	11.5	I
			200	41.7	III
123	*30682	Chrysanthemumic acid, 2-bromo-4,5-methylene-dioxyphenyl ester	25	-9.4	0
			100	-10.9	0
124	*21195	Chrysanthemumic acid, 6-bromopiperonyl ester	10	8.9	I
			25	31.8	II
			50	45.3	III
			100	53.0	III
			200	58.0	III
125	*21557	Chrysanthemumic acid, 6-chloropiperonyl ester	10	28.7	II
			25	32.0	II
			50	49.4	III
			100	56.5	III
			200	58.7	III
126	*21170	Chrysanthemumic acid, 2,4-dimethylbenzyl ester	10	29.5	II
			25	31.5	II
			50	32.0	II
			100	44.6	III
			200	50.2	III
127	*21825	Chrysanthemumic acid, 3,4-dimethylbenzyl ester	10	23.0	II
			25	27.4	II
			50	38.8	II
			100	31.6	II
			200	44.4	III
128	*21340	Chrysanthemumic acid, m-ethoxybenzyl ester	10	-4.3	0
			25	3.6	I
			50	14.3	I
			100	26.4	II
			200	29.0	II
129	*21558	Chrysanthemumic acid, p-ethylbenzyl ester	10	17.0	I
			25	15.2	I
			50	26.7	II
			100	44.1	III
			200	53.4	III

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
130	*21426	Chrysanthemumic acid, m-isopropoxybenzyl ester	10	13.9	I
			25	21.6	II
			50	33.8	II
			100	40.4	III
			200	22.9	II
131	*21173	Chrysanthemumic acid, m-methoxybenzyl ester	10	2.5	I
			25	25.8	II
			50	19.1	I
			100	8.4	I
			200	14.3	I
132	*21342	Chrysanthemumic acid, m-propoxybenzyl ester	10	-12.9	0
			25	26.6	II
			50	5.1	I
			100	15.0	I
			200	39.2	II
133	*5096	Cinnamaldehyde, alpha-hexyl-	25	7.5	I
			100	14.9	I
			200	36.8	II
134	23709	Cinnamic acid, trans-	25	8.9	I
			100	-0.3	0
			200	14.7	I
135	*2383	Cinnamic acid, sec-butyl ester	25	5.0	I
			100	11.4	I
			200	12.7	I
136	667	Cinnamic acid, ethyl ester	10	19.6	I
			25	30.8	II
			100	46.2	III
			200	32.7	II
137	*2384	Cinnamic acid, isobutyl ester	25	54.9	III
			100	46.9	III
			200	54.4	III
138	10027	Cinnamic acid, alpha-acetyl-, methyl ester	25	16.6	I
			100	35.9	II
			200	63.2	IV
139	*2864	Cinnamic acid, alpha-methyl-, trans-, ethyl ester	25	0.1	I
			100	19.6	I
			200	28.4	II
140	949	Cinnamyl alcohol	10	-0.7	0
			25	-2.7	0
			100	14.0	I
			200	17.8	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
141	*5012	Citric acid, tripropyl ester	25	-16.8	0
			100	-12.0	0
			200	20.9	II
142	753	Coumarin	25	25.8	II
			50	42.2	III
			100	53.6	III
			200	57.2	III
143	101	o-Cresol, 4,6-dibromo-	25	52.0	III
			100	63.8	IV
			200	53.0	III
144	10060	p-Cresol, 2-propenyl-	25	16.6	I
			100	31.9	II
			200	45.0	III
145	6287	Crotonic acid	25	-19.4	0
			100	-21.8	0
			200	-33.4	0
146	6047	Crotonic acid, cyclohexyl ester	25	19.0	I
			50	16.4	I
			100	9.0	I
			200	3.6	I
147	6191	Crotonic acid, phenethyl ester	25	25.7	II
			100	58.2	III
			200	54.4	III
148	6270	Crotonic acid, trimethylene ester	25	-7.8	0
			100	23.9	II
			200	71.0	IV
149	152	2,5-Cyclohexadien-1-one, hexachloro-	25	17.6	I
			100	21.9	II
			200	45.5	III
150	14243	Cyclohexaneacetic acid	10	6.0	I
151	6225	Cyclohexaneacetic acid, 1-hydroxy-, propyl ester	25	-15.0	0
			100	-2.7	0
			200	21.2	II
152	3957	Cyclohexanecarbonitrile, 1-hydroxy-x-methyl-	25	-25.7	0
			100	-18.5	0
			200	-17.8	0
153	1854	Cyclohexanecarboxylic acid	10	16.6	I
			25	9.0	I
			100	2.2	I
			200	4.2	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
154	7048	Cyclohexanecarboxylic acid, 3-butynyl ester	25	33.0	II
			50	37.2	II
			100	42.0	III
			200	31.0	II
155	6133	Cyclohexanecarboxylic acid, 1-hydroxy-, cyclopentyl ester	25	5.4	I
			100	15.9	I
			200	10.6	I
156	6494	Cyclohexanecarboxylic acid, 1-hydroxy-, 2-ethoxyethyl ester	25	17.6	I
			50	24.2	II
			100	30.6	II
			200	30.2	II
157	13182	1,2-Cyclohexanedicarboximide, N-allyl-4-methyl-	25	-13.6	0
			100	12.4	I
			200	26.6	II
158	13105	1,2-Cyclohexanedicarboximide, N-sec-butyl-	25	25.4	II
			50	33.8	II
			100	33.4	II
			200	37.8	II
159	13108	1,2-Cyclohexanedicarboximide, N-isobutyl-	25	-10.2	0
			100	7.8	I
			200	33.0	II
160	13186	1,2-Cyclohexanedicarboximide, N-isobutyl-4-methyl-	25	1.5	I
			100	26.2	II
			200	55.8	III
161	13189	1,2-Cyclohexanedicarboximide, N-isopropyl-4-methyl-	25	3.5	I
			100	9.4	I
			200	19.1	I
162	5915	1,2-Cyclohexanedicarboxylic acid, diisopropyl ester	25	7.4	I
			100	7.8	I
			200	3.6	I
163	10025	1,3-Cyclohexanediol	10	3.2	I
164	*6236	1,3-Cyclohexanediol, diacetate	25	-22.5	0
			100	0	0
			200	-12.8	0
165	10531	Cyclohexaneglyoxylic acid, 2-oxo-, ethyl ester	10	-22.6	0
166	1023	Cyclohexanol, 2-cyclohexyl-	10	1.2	I
167	431	Cyclohexanol, 4-tert-pentyl-	25	33.4	II
			100	37.4	II
			200	8.8	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
168	*5511	Cyclohexanol, 2-(2,5-xylyl)-, trans-	25	-69.4	0
			100	-58.2	0
			200	-20.5	0
169	*4093	Cyclohexanone, 4-cyclohexyl-	25	22.1	II
			100	13.8	I
			200	17.9	I
170	7289	Cyclohexanone, 4-methyl-, oxime	25	4.8	I
			100	20.8	II
			200	23.8	II
171	5023	2-Cyclohexene-$\Delta^{1,alpha}$-acetic acid, alpha,3,5,5-tetramethyl-, methyl ester	25	23.2	II
			100	36.6	II
			200	56.1	III
172	*7150	3-Cyclohexene-1-carboxaldehyde, 4,6-dimethyl-, oxime	25	10.8	I
			100	18.2	I
			200	14.8	I
173	*6535	2-Cyclohexene-1-carboxylic acid, 2,6-dimethyl-4-oxo-, ethyl ester	25	10.1	I
			100	47.6	III
			200	62.0	IV
174	*20221	3-Cyclohexene-1-carboxylic acid, 6-methyl-	25	-1.3	0
			100	8.8	I
			200	-7.5	0
175	7369	4-Cyclohexene-1,2-dicarboximide, N-sec-butyl-	25	13.9	I
			100	20.4	II
			200	24.8	II
176	7395	4-Cyclohexene-1,2-dicarboximide, N-isopropyl-	25	13.2	I
			100	11.8	I
			200	38.9	II
177	17214	4-Cyclohexene-1,3-dione, 2,2,4,6,6-pentachloro-	10	-12.8	0
178	*6596	Cyclopentaneacetic acid, 1-hydroxy-, cyclohexyl ester	25	15.4	I
			100	21.8	II
			200	32.6	II
179	4923	$\Delta^{1,alpha}$-Cyclopentaneacetic acid, alpha-cyano-, methyl ester	25	8.4	I
			100	24.2	II
			200	14.2	I
180	*6139	Cyclopentanecarboxylic acid, 1-hydroxy-, cyclopentyl ester	25	-9.7	0
			100	-4.0	0
			200	-10.3	0

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
181	*6483	Cyclopentanecarboxylic acid, 2-oxo-, 2-ethoxyethyl ester	25	4.9	I
			100	35.6	II
			200	36.2	II
182	*21574	Cyclopropanecarboxylic acid, 3-isobutyl-2,2-dimethyl-, 2,4-dimethylbenzyl ester	10	37.4	II
			25	16.3	I
			50	26.4	II
			100	29.0	II
			200	38.2	II
183	*21499	Cyclopropanecarboxylic acid, 3-isobutyl-2,2-dimethyl-, piperonyl ester	10	-11.1	0
			25	10.8	I
			50	15.2	I
			100	26.5	II
			200	37.2	II
184	11198	2,4,8-Decatrienoic acid, 2-cyano-5,9-dimethyl-, ethyl ester	10	17.6	I
185	6597	Diethylene glycol, bis=(propyl carbonate)	25	26.1	II
			100	36.0	II
			200	51.7	III
186	15142	Dihexylamine, 1-methyl-	10	-14.3	0
187	5723	m-Dioxane, 2-(p-methoxy=phenyl)-4,4,6-trimethyl-	25	-24.1	0
			100	27.5	II
			200	28.6	II
188	7102	m-Dioxane, 5-methyl-5-nitro-2-propyl-	25	-1.1	0
			100	8.8	I
			200	20.7	II
189	*13161	m-Dioxane, 2-styryl-	25	12.0	I
			100	27.2	II
			200	48.2	III
190	7694	m-Dioxane-2-acetic acid, 5-hydroxy-2-methyl-, ethyl ester and 1,3-Dioxolane-2-acetic acid, 4-(hydroxymethyl)-2-methyl-, ethyl ester	10	-9.2	0
191	*5102	m-Dioxan-5-ol, 2-butyl-	25	3.2	I
			100	6.2	I
			200	10.9	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
192	5024	m-Dioxan-5-ol, 2-hexyl-	25	16.3	I
			100	22.4	II
			200	46.1	III
193	*5078	m-Dioxan-5-ol, 2-pentyl-	25	18.1	I
			100	28.2	II
194	7425	1,4-Dioxaspiro[4.5]decane-2-methanol	25	13.4	I
			100	8.6	I
			200	22.0	II
195	5032	1,4-Dioxaspiro[4.5]decane-2-methanol, (5,6 or 7)-methyl- and 1,3-Dioxa = spiro[5.5]undecan-3-ol, (6,7 or 8)-methyl-	25	6.0	I
			100	-7.3	0
			200	-4.8	0
196	13094	1,4-Dioxaspiro[4.4]nonane-3-methanol	25	-17.8	0
			100	-2.7	0
			200	-11.0	0
197	5027	1,3-Dioxolane, 2-hexyl-4-(methoxymethyl)-	25	5.0	I
			100	24.4	II
			200	28.0	II
198	6548	1,3-Dioxolane-4,5-dicarboxylic acid, 2-ethyl-2-methyl-, dimethyl ester	25	-5.0	0
			100	-13.3	0
			200	-14.5	0
199	6571	1,3-Dioxolane-4,5-dicarboxylic acid, 2-methyl-2-propyl-, dimethyl ester	25	1.5	I
			100	9.0	I
			200	14.0	I
200	*6512	1,3-Dioxolane-2-propion= amide, 2-methyl-N,N-dipropyl-	25	12.4	I
			100	7.9	I
			200	3.6	I
201	15956	1,4-Dodecadien-3-one	10	-11.4	0
202	1826	Elemol	10	18.1	I
203	2761	Ephedrine	25	24.0	II
			100	18.4	I
			200	16.3	I
204	7353	Ethane, 1-(benzyloxy)-2-(2-methylallyloxy)-	25	9.5	I
			100	9.0	I
			200	16.4	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
205	1656	Ethane, 1,2-dichloro-	25	-7.6	0
			100	-14.0	0
			200	-3.9	0
206	16757	Ethanol, 2-(benzylcyclo= hexylamino)-	10	9.2	I
207	1954	Ethanol, 2-(2-butoxy= ethoxy)-	10	0.3	I
			25	-1.2	0
			100	7.5	I
			200	1.7	I
208	170	Ethanol, 2-(2-butoxy= ethoxy)-, acetate	25	17.7	I
			100	20.4	II
			200	25.6	II
209	2225	Ethanol, 2-(p-chloro= phenoxy)-	10	10.9	I
			25	-18.6	0
			100	-6.8	0
			200	17.0	I
210	3395	Ethanol, 2-(p-cumenyloxy)-	25	24.6	II
			100	21.6	II
			200	28.6	II
211	300	Ethanol, 2-[2-(2-ethyl= hexyloxy)ethoxy]-	25	-13.0	0
			100	-7.4	0
			200	4.6	I
212	16590	Ethanol, 2-[2-(1-ethyl= pentyloxy)ethoxy]-	25	-14.5	0
			100	-10.4	0
			200	16.3	I
213	301	Ethanol, 2-(2-hexyloxy= ethoxy)-	25	11.8	I
			100	35.0	II
			200	27.9	II
214	4337	Ethanol, 2-[2-(2-p menthyloxyethoxy)= ethoxy]-	25	0.6	I
			100	10.2	I
			200	-28.3	II
215	164	Ethanol, 2-(alpha-methyl= benzyloxy)-	25	22.0	II
			100	9.7	I
			200	13.6	I
216	165	Ethanol, 2-(alpha-methyl= benzyloxy)-, acetate	25	8.6	I
			100	28.1	II
			200	17.4	I
217	773	Ethanol, 2-(3-methyl-2- norbornylmethoxy)-	25	54.8	III
			100	64.3	IV
			200	55.7	III

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
218	16591	Ethanol, 2-(2-nonyloxy=ethoxy)-	25	-20.6	0
			100	-7.8	0
			200	-9.2	0
219	3597	Ethanol, 2-(pinenyloxy)-("DHS Activator", Sample III)	25	19.0	I
			100	14.5	I
			200	15.6	I
220	3598	Ethanol, 2-(pinenyloxy)-("DHS Activator", Sample IV)	25	18.2	I
			100	19.6	I
			200	26.8	II
221	9221	1H-1,3a-Ethanopentalen-7-ol, 2,3,6,6a-tetrahydro-	25	11.4	I
			100	9.5	I
			200	37.2	II
222	*16531	Ether, p-tert-butylphenyl 2,4-dinitrophenyl	25	-3.4	0
			100	3.2	I
			200	15.2	I
223	*16584	Ether, o-chlorophenyl 2,4-dinitrophenyl	25	26.2	II
			100	31.9	II
			200	36.1	II
224	16583	Ether, p-chlorophenyl 2,4-dinitrophenyl	25	16.7	I
			100	-0.1	0
			200	2.6	I
225	*16529	Ether, o-cyclohexylphenyl 2,4-dinitrophenyl	25	19.3	I
			100	29.8	II
			200	41.4	III
226	*16585	Ether, 2,4-dichlorophenyl 2,4-dinitrophenyl	25	17.8	I
			100	1.5	I
			200	-13.7	0
227	*16580	Ether, 2,4-dinitrophenyl p-tolyl	25	9.4	I
			100	15.2	I
			200	2.2	I
228	*16586	Ether, 2,4-dinitrophenyl 2,4,6-trichlorophenyl	25	11.4	I
			100	12.0	I
			200	0.2	I
229	4723	Ethylene glycol, alkyl benzyl ethers	25	-0.8	0
			100	7.1	I
			200	9.4	I
230	16744	Formamide, N-butyl-N-cyclohexyl-	10	-0.2	0

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
231	1800	Formamide, N,N-diphenyl-	25	9.5	I
			100	27.6	II
			200	44.4	III
232	*1089	Formanilide	25	2.4	I
			100	25.5	II
233	*12079	Formanilide, N-butyl-	10	19.6	I
			25	15.9	I
			100	19.0	I
			200	27.7	II
234	*2702	Furan, 2-(benzyloxy= methyl)tetrahydro-	25	8.5	I
			100	38.4	II
			200	41.5	III
235	12055	2-Furanacrylamide, N,N-diethyl-	10	38.5	II
236	5534	2-Furanacrylic acid, allyl ester	25	2.3	I
			100	4.4	I
			200	12.0	I
237	6156	2-Furanacrylic acid, butyl ester	25	-13.9	0
			100	-20.6	0
			200	-25.2	0
238	5540	2-Furanacrylic acid, 2-methoxyethyl ester	25	-13.6	0
			100	7.7	I
			200	-0.8	0
239	3301	2-Furanacrylic acid, methyl ester	25	7.8	I
			100	3.2	I
			200	2.0	I
240	11634	2-Furanpropionic acid, beta-oxo-, ethyl ester	10	9.0	I
241	11648	2-Furanpropionic acid, tetrahydro-beta-hydroxy-, ethyl ester	10	8.4	I
242	104	Furfuryl alcohol, tetrahydro-	25	2.6	I
			100	17.4	I
			200	17.4	I
243	1487	2-Furoic acid, cyclo= hexyl ester	10	22.5	II
			25	37.3	II
			100	27.1	II
			200	38.4	II

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
244	206	Geraniol	25	3.7	I
			100	0.4	I
			200	12.5	I
245	*6375	Glutaramic acid, N,N-diisopropyl-, methyl ester	25	-4.3	0
			100	24.6	II
			200	62.4	IV
246	15541	Glutarimide, 3-[2-(3,5-dimethyl-2-oxocyclohexyl)-2-hydroxyethyl]-	25	-7.2	0
			100	25.0	II
			200	44.6	III
247	26084	Glutarimide, 3-[2-(3,5-dimethyl-2-oxocyclohexyl)-2-hydroxyethyl]-, acetate	25	-5.8	0
			100	21.2	II
			200	14.7	I
248	*6551	Glyceric acid, 2-methyl-, cyclohexyl ester, 3-acetate	25	6.8	I
			100	39.4	II
			200	33.8	II
249	*6499	Glyceric acid, 2-methyl-, isopentyl ester, 3-acetate	25	8.1	I
			100	6.0	I
			200	12.5	I
250	*7404	Glycidic acid, 2-ethyl-3-phenyl-, ethyl ester	25	8.2	I
			100	20.2	II
			200	16.8	I
251	7388	Glycidic acid, 2-methyl-3-phenyl-, ethyl ester	10	3.1	I
252	4339	Glycine, N-butyl-, isobornyl ester	25	5.9	I
			100	38.1	II
			200	54.8	III
253	*2467	Guaiacol, 6-allyl-	25	-22.8	0
			100	-23.3	0
			200	-21.0	0
254	23124	2,6-Heptadienoic acid, 6-methyl-	25	20.7	II
			100	26.0	II
			200	43.0	III
255	5963	2,4-Heptanediol, 6-methyl-	25	-34.7	0
			100	-25.0	0
			200	-39.0	0
256	*6387	Heptanoic acid, 5-hydroxypentyl ester	25	-6.9	0
			100	53.4	III
			200	55.4	III

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
257	11544	Heptanoic acid, 3-phenyl-	10	39.9	II
			25	-8.6	0
			100	-11.6	0
258	15146	Heptylamine, N-hexyl-	10	12.8	I
259	*6563	Hexanamide, N,N-diethyl-3-hydroxy-3-methyl-	25	11.5	I
			100	6.8	I
			200	3.8	I
260	12192	1,3-Hexanediol, 2-isopropyl-5-methyl-	25	10.5	I
			100	-7.4	0
			200	17.1	I
261	7555	2,4-Hexanediol, 3,4-dimethyl-	10	-23.4	0
262	12014	2,4-Hexanediol, 3-methyl-	25	-4.6	0
			100	-0.6	0
			200	-4.6	0
263	*5838	2,4-Hexanediol, 5-methyl-	25	21.8	II
			50	-0.4	0
			100	9.2	I
			200	16.2	I
264	15990	Hexanoic acid, 2-dimethylaminoethyl ester	10	-0.6	0
265	*6094	Hexanoic acid, 3-hydroxypropyl ester	25	11.2	I
			100	15.8	I
			200	21.8	II
266	*6169	Hexanoic acid, tetrahydrofurfuryl ester	25	-9.2	0
			100	5.9	I
			200	28.6	II
267	*6106	Hexanoic acid, trimethylene ester	25	-19.6	0
			100	18.0	I
			200	27.4	II
268	6210	Hexanoin	25	16.4	I
			100	12.1	I
			200	40.9	III
269	24649	2-Hexenal	25	-38.2	0
			100	-39.5	0
			200	-17.8	0
270	8105	2-Hexenal, 2-ethyl-	25	-52.6	0
			100	-41.3	0
			200	-37.3	0

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
271	4900	2-Hexenenitrile, 2-ethyl-3-methyl-	25	-3.4	0
			100	2.4	I
			200	15.6	I
272	3056	1-Hexen-3-one, 1-(2-furyl)-5-methyl-	25	-13.0	0
			100	-7.8	0
			200	9.1	I
273	14500	3-Hexyne-2,5-diol, 2,5-dimethyl-	25	16.7	I
			100	10.9	I
			200	16.4	I
274	13013	Hydratropaldehyde, oxime	25	-2.5	0
			100	25.2	II
			200	31.0	II
275	892	Hydrocinnamic acid	25	3.6	I
			100	6.1	I
			200	7.6	I
276	5992	2-Indanol, 1-ethoxy-	25	-11.6	0
			100	18.4	I
			200	20.1	II
277	*3945	Indole, 2-methyl-	25	-0.4	0
			100	12.5	I
			200	22.4	II
278	5529	Isobutyl sulfone	25	12.6	I
			100	9.8	I
			200	3.5	I
279	6435	Isobutyric acid, diester with 1,2-cyclohexanediol	25	-6.1	0
			100	-10.2	0
			200	3.4	I
280	*11009	Ketone, cyclohexyl phenyl	25	17.3	I
			100	27.4	II
			200	26.4	II
281	5870	Ketone, 2-furyl p-methoxyphenyl	25	-6.8	0
			100	14.4	I
			200	20.6	II
282	17337	Ketone, methyl 5-nitro-2-furyl	25	22.2	II
			100	31.7	II
			200	43.2	III
283	3130	Lactic acid	25	-36.3	0
			100	-33.6	0
			200	-30.6	0

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
284	4234	Lactic acid (82%)	25	-22.3	0
			100	-46.6	0
			200	-46.0	0
285	3864	Lactic acid, 2-benzyl-oxyethyl ester, butyrate	25	60.4	IV
			100	58.3	III
			200	65.6	IV
286	14484	Lactic acid, butoxyethoxyethyl ester	10	16.3	I
287	3166	Lactic acid, 2-(2-butoxyethoxy)ethyl ester	25	-8.4	0
			100	-8.9	0
			200	-18.2	0
288	2879	Lactic acid, 2-chloroallyl ester	25	5.7	I
			100	20.2	II
			200	23.5	II
289	1654	Lactic acid, 2-methyl-, benzyl ester	25	-19.1	0
			100	-20.6	0
			200	7.3	I
290	1650	Lactic acid, 2-methyl-, phenethyl ester	10	24.6	II
			25	2.1	I
			100	30.0	II
			200	25.9	II
291	14454	Lactic acid, 2-methyl-, phenyl ester, acetate	25	-12.6	0
			100	-3.8	0
			200	-15.4	0
292	4296	Lactic acid, 2-methyl-, tetrahydrofurfuryl ester	25	-7.4	0
			100	-31.6	0
			200	-38.2	0
293	968	Lauric acid, 2-hydroxypropyl ester	10	2.9	I
294	2321	Levulinic acid, 2-chloroallyl ester	25	-0.6	0
			100	-7.0	0
			200	-2.7	0
295	3926	Levulinic acid, tetrahydrofurfuryl ester	25	-11.9	0
			100	-15.2	0
			200	10.3	I
296	2531	Maleic acid, diallyl ester	25	9.8	I
			100	9.1	I
			200	11.6	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
297	337	Malic acid, dibutyl ester	10	-5.1	0
			25	-7.4	0
			100	-12.4	0
			200	-7.2	0
298	4025	Malonic acid, (ethoxy= methylene-), diethyl ester	25	14.9	I
			100	23.0	II
			200	10.8	I
299	16838	Malononitrile, 1-cyclo= propylethylidene-	10	19.8	I
			25	44.8	III
			100	55.1	III
			200	61.5	IV
300	1788	Mandelic acid, isopropyl ester	10	18.3	I
			25	23.2	II
			100	33.2	II
			200	38.9	II
301	1787	Mandelic acid, methyl ester	10	25.1	II
			25	-4.8	0
			100	-1.4	0
			200	-6.6	0
302	1769	p-Menthane-1,8-diol, diacetate	10	36.0	II
			25	-5.3	0
			100	1.0	I
			200	26.2	II
303	24710	p-Menthane-2,3-diol	25	-37.4	0
			100	-50.4	0
			200	-15.0	0
304	2819	p-Menthan-2-ol	25	14.0	I
			100	16.4	I
			200	5.8	I
305	748	Methane, diphenyl-	10	-7.8	0
306	3343	Morpholine, 4-myristoyl-	25	12.3	I
			100	26.0	II
			200	36.4	II
307	18284	Morpholine, 4-nonanoyl-	25	15.4	I
			100	39.1	II
			200	49.5	III
308	*30700	1-Naphthoic acid, 2-bromo- 4,5-methylenedioxy= phenyl ester	25	-8.1	0
			100	1.4	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
309	6204	1-Naphthol, decahydro-	25	20.8	II
			100	41.4	III
			200	47.6	III
310	7035	1-Naphthonitrile	25	13.0	I
			100	29.7	II
			200	19.9	I
311	17335	Nicotinic acid, cyclo= hexyl ester	10	28.6	II
			25	10.2	I
			100	32.0	II
			200	55.6	III
312	11314	beta-Nicotyrine	10	9.8	I
313	8440	2,3-Norbornanedicar= boxylic acid, diethyl ester	10	-4.4	0
314	8439	5-Norbornene-2,3-dicarboxyl= ic acid, methyl propyl ester	25	28.9	II
			100	23.6	II
			200	39.7	II
315	4476	2-Octadecynoic acid, methyl ester	25	10.6	I
			100	12.2	I
			200	33.8	II
316	5824	Octanal, 7-hydroxy-3,7- dimethyl-, dimethyl acetal	25	8.8	I
			100	18.2	I
			200	44.9	III
317	*12026	3,5-Octanediol, 4-ethyl-	25	4.5	I
			100	-3.0	0
			200	5.8	I
318	4162	Octanoic acid	25	9.4	I
			100	15.4	I
			200	8.4	I
319	4790	Octanoic acid, 1,3,3- trimethyl-2-norbornyl ester	25	9.9	I
			100	18.9	I
			200	37.5	II
320	5877	Octanoic acid, 4-ethyl- 4-formyl-	25	14.9	I
			100	21.1	II
			200	48.7	III
321	13127	4-Octenoic acid, 4- ethyl-3-hydroxy-, methyl ester	25	-13.5	0
			100	12.3	I
			200	19.8	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
322	463	Oils, bay	10	16.0	I
			25	44.7	III
			100	35.1	II
			200	40.7	III
323	630	Oils, geranium, Bourbon	10	15.9	I
324	7179	1-Oxaspiro[2.5]octane-2-carboxylic acid, 2-methyl-, allyl ester	10	6.5	I
325	*5698	Oxazolidine, 4,4-dimethyl-2-phenyl-	25	-15.3	0
			100	-25.4	0
			200	-21.2	0
326	*11231	1-Pentanol, 5-phenyl-	25	-10.9	0
			100	4.8	I
			200	17.4	I
327	3077	1-Penten-3-one, 1-(2-furyl)-4,4-dimethyl-	25	32.8	II
			100	8.3	I
			200	6.6	I
328	744	Phenethyl alcohol	25	9.0	I
			100	27.2	II
			200	10.8	I
329	2518	Phenethyl alcohol, p-bromo-	25	21.3	II
			100	17.1	I
			200	26.2	II
330	2719	Phenethyl alcohol, p-chloro-	25	12.8	I
			100	41.8	III
			200	23.6	II
331	2103	Phenethyl alcohol, ar-chloro-ar-ethyl-	25	-7.0	0
			100	4.5	I
			200	15.9	I
332	2718	Phenethyl alcohol, ar-ethyl-	25	-0.9	0
			100	-9.8	0
			200	14.5	I
333	*5889	Phenethyl alcohol, p-isopropoxy-	25	-2.7	0
			100	5.8	I
			200	12.8	I
334	7014	Phenethyl alcohol, o-methyl-	25	45.0	III
			50	35.2	II
			100	46.4	III
			200	43.2	III

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
335	16777	Phenethylamine, N-hexyl-	10	22.2	II
			25	28.6	II
			100	6.2	I
			200	7.0	I
336	5616	Phenetole	25	-3.4	0
			100	-8.4	0
			200	-8.2	0
337	*30692	Phenol, 2-bromo-4,5-methylenedioxy-, benzoate	25	-29.1	0
			100	-12.2	0
338	145	Phenol, 2-bromo-4-phenyl-	25	26.7	II
			100	18.6	I
			200	47.2	III
339	126	Phenol, p-tert-butyl-	25	55.5	III
			100	53.8	III
			200	58.2	III
340	1122	Phenol, 2-sec-butyl-4,6-dinitro-	25	20.9	II
			100	51.6	III
341	157	Phenol, 2-cyclohexyl-4,6-dinitro-	25	25.6	II
			100	23.3	II
			200	35.5	II
342	78	Phenol, 2,4-dichloro-	25	-0.5	0
			100	23.0	II
			200	24.4	II
343	459	Phenol, 2,6-dichloro-4-tert-pentyl-	25	11.7	I
			100	23.7	II
			200	27.3	II
344	11189	Phenol, 2,3-dimethoxy-	10	6.6	I
345	1535	Phenol, 2,4-dinitro-	25	19.2	I
			100	31.2	II
			200	33.8	II
346	*31250	Phenol, 2-(2-methylallyl)-4,5-methylenedioxy-	25	-40.2	0
			100	-34.8	0
347	*30617	Phenol, 4,5-methylenedioxy-2-nitro-, acetate	25	17.3	I
			100	66.6	IV
			200	67.1	IV
348	3451	Phenol, phenethyl-	25	15.0	I
			100	20.5	II
			200	14.9	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
349	62	Phenol, o-phenyl-	25	22.3	II
			100	31.3	II
			200	43.0	III
350	3346	Phenol, 2,4,6-tris = (dimethylaminomethyl)-	25	20.6	II
			100	-44.6	0
			200	-20.5	0
351	283	Phthalic acid, dibutyl ester	25	-2.2	0
			100	5.3	I
			200	21.3	II
352	4869	Phthalic anhydride	25	-38.3	0
			100	-36.8	0
			200	-33.9	0
353	5785	Phthalide	25	14.4	I
			50	20.8	II
			100	23.8	II
			200	41.4	III
354	2617	Phthalimide, N-benzyl-	10	-6.7	0
			25	-8.1	0
			50	-2.2	0
			100	-5.6	0
			200	-9.0	0
355	*2418	Phthalimide, N-butyl-	10	4.6	I
			25	5.0	I
			50	10.3	I
			100	35.3	II
			200	59.9	III
356	*2419	Phthalimide, N-sec-butyl-	10	-10.1	0
			25	2.4	I
			50	-5.4	0
			100	-0.1	0
			200	9.4	I
357	*1394	Phthalimide, N-ethyl-	10	22.4	II
			25	41.8	III
			50	56.7	III
			100	66.8	IV
			200	76.8	IV
358	*2422	Phthalimide, N-heptyl-	10	-4.6	0
			25	-5.8	0
			50	2.4	I
			100	-0.1	0
			200	14.5	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
359	*1397	Phthalimide, N-isobutyl-	10	4.1	I
			25	10.9	I
			50	-10.9	0
			100	-6.3	0
			200	34.1	II
360	*1396	Phthalimide, N-isopropyl-	10	3.7	I
			25	14.8	I
			50	13.6	I
			100	16.6	I
			200	22.0	II
361	*1393	Phthalimide, N-methyl-	10	63.0	IV
			25	66.2	IV
			50	69.0	IV
			100	72.9	IV
			200	74.8	IV
362	2420	Phthalimide, N-1-methyl=butyl-	10	-16.3	0
			25	-0.5	0
			50	5.9	I
			100	3.7	I
			200	-1.5	0
363	*2421	Phthalimide, N-1-methyl=pentyl-	10	-3.7	0
			25	-7.1	0
			50	-5.5	0
			100	-11.1	0
			200	-3.8	0
364	*2396	Phthalimide, N-octyl-	10	-4.4	0
			25	8.2	I
			50	11.0	I
			100	27.0	II
			200	44.2	III
365	*1395	Phthalimide, N-propyl-	10	-9.7	0
			25	12.0	I
			50	46.6	III
			100	61.3	IV
			200	78.4	IV
366	*5550	Piperidine, 1-benzoyl-	25	-67.0	0
			100	-48.2	0
			200	29.0	II
367	*17308	Piperidine, 1,1'-carbonyldi-	25	1.9	I
			100	37.0	II
			200	60.7	IV
368	11537	Piperidine, 1-lactoyl-	10	-3.0	0

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
369	11531	Piperidine, 1-phenethyl-	25	7.6	I
			100	3.8	I
			200	34.4	II
370	147	Piperonal	25	-8.0	0
			100	33.0	II
			200	42.7	III
371	*6383	Pivalic acid, pentamethylene ester	25	-30.7	0
			100	-22.3	0
			200	-25.8	0
372	4201	1,2-Propanediol, 3-(hexyloxy)-	25	-10.6	0
			100	15.0	I
			200	33.6	II
373	3554	1,2-Propanediol, 3-(isopentyloxy)-	25	7.5	I
			100	-1.5	0
			200	30.1	II
374	5037	1,2-Propanediol, 3-(3,4-xylyloxy)-	25	17.5	I
			100	27.5	II
			200	16.2	I
375	3358	1,3-Propanediol, 2-amino-2-ethyl-	25	21.3	II
			100	-29.4	0
			200	-36.9	0
376	4265	1-Propanol, 2-amino-3-(isobornyloxy)-2-methyl-	25	4.1	I
			100	25.9	II
			200	51.2	III
377	*15944	1-Propanol, 3-chloro-2,2-bis(chloromethyl)-	25	-20.8	0
			100	-24.4	0
			200	-7.6	0
378	374	1-Propanol, 2-(2-cyclohexyloxypropoxy)-	10	-2.6	0
			25	-8.9	0
			100	6.4	I
			200	3.8	I
379	*17385	1-Propanol, 3-phenoxy-	25	-10.7	0
			100	28.2	II
			200	11.1	I
380	4200	2-Propanol, 1,1'-oxybis[3-(2-ethylbutoxy)]-	25	-6.8	0
			100	8.8	I
			200	54.8	III
381	299	2-Propanol, 1-[(tetrahydro-2,6-dimethyl-3-pyranyl)methoxy]-	25	-8.7	0
			100	-5.2	0
			200	6.7	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
382	6579	2-Propanone, hydroxy-, benzoate	25	7.1	I
			100	28.9	II
			200	27.0	II
383	*21869	Propionamide, N-hexyl-2-methyl-	25	8.7	I
			100	26.8	II
			200	38.6	II
384	*3368	Propionamide, 2,2,3-trichloro-	25	43.6	III
			100	43.0	III
			200	43.7	III
385	*5794	Propionanilide, N-butyl-	25	-15.2	0
			100	-8.8	0
			200	-1.4	0
386	*2638	Propionanilide, N-ethyl-2-methyl-	25	33.2	II
			100	24.2	II
			200	23.5	II
387	12030	Propionanilide, N-propyl-	25	-0.4	0
			100	8.6	I
			200	-2.8	0
388	*6310	Propionic acid, ester with N-butyl-N-(2-hydroxyethyl)propionamide	25	8.7	I
			100	-17.0	0
			200	-8.9	0
389	*6319	Propionic acid, hexamethylene ester	25	-14.4	0
			100	37.2	II
			200	63.1	IV
390	*6317	Propionic acid, 5-hydroxypentyl ester	25	-7.2	0
			100	21.5	II
			200	37.2	II
391	6526	Propionic acid, beta-hydroxyphenethyl ester	25	-8.8	0
			100	18.0	I
			200	28.9	II
392	30669	Propionic acid, 4,5-methylenedioxy-2-nitrophenyl ester	25	6.6	I
			100	56.9	III
			200	68.7	IV
393	*5719	Propionic acid, 1,2,3,4-tetrahydro-2-naphthyl ester	25	-7.0	0
			100	-22.4	0
			200	7.0	I
394	19554	Propionic acid, 3-thiocyanatopropyl ester	25	8.1	I
			100	38.9	II
			200	44.0	III

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
395	14479	Propionic acid, 3-butoxy-, 2-butoxyethyl ester	10	20.2	II
			25	28.9	II
			100	38.4	II
			200	43.5	III
396	3248	Propionic acid, 3-methoxy-, 2-ethoxyethyl ester	25	6.9	I
			100	6.2	I
			200	2.8	I
397	2075	Propyl sulfone	25	-7.2	0
			100	-8.2	0
			200	23.7	II
398	31868	Pyrethrosin	25	-2.4	0
			100	-9.1	0
			200	-3.9	0
399	11559	Pyridine, 2-benzyl-	10	44.8	III
			25	2.2	I
			100	12.4	I
400	11613	2,3-Pyridinedicarboxylic acid, diethyl ester	10	32.6	II
			25	-3.9	0
			100	-8.7	0
401	6581	Pyrrole-1-acetic acid, cyclopentyl ester	25	20.2	II
			100	11.4	I
			200	-10.6	0
402	483	8-Quinolinol	25	22.3	II
			100	16.9	I
			200	17.0	I
403	3996	Resorcinol	25	-2.0	0
			100	0.5	I
			200	-1.8	0
404	*2359	Resorcinol, monoacetate	25	-33.6	0
			100	-17.4	0
			200	-16.8	0
405	*5002	Salicylic acid, methyl ester, propionate	25	-33.6	0
			100	-32.1	0
			200	-36.4	0
406	*5088	Sorbic acid, propyl ester	25	10.0	I
			100	24.1	II
407	1633	Stearin, tri-	25	2.6	I
			100	2.6	I
			200	5.3	I

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
408	*6245	Succinamic acid, N,N-dibutyl-, propyl ester	25	-11.0	0
			100	32.5	II
			200	28.9	II
409	6388	Succinamic acid, N,N-diethyl-, sec-butyl ester	25	8.8	I
			100	36.6	II
			200	74.8	IV
410	6252	Succinamic acid, N,N-dipropyl-, ethyl ester	25	-10.0	0
			100	17.6	I
			200	45.3	III
411	*6251	Succinamic acid, N,N-dipropyl-, propyl ester	25	-14.7	0
			100	23.1	II
			200	65.0	IV
412	666	Succinic acid, dibutyl ester	25	-7.0	0
			100	13.9	I
			200	45.4	III
413	*31668	Succinimide, N-butyl-	25	1.4	I
			100	34.0	II
			200	41.6	III
414	*31673	Succinimide, N-sec-butyl-	25	-22.7	0
			100	-33.7	0
			200	-27.5	0
415	*31795	Succinimide, N-ethyl-2-(1,1,3,5-tetramethyl-2-octenyl)-	25	7.6	I
			100	33.0	II
			200	32.1	II
416	31674	Succinimide, N-hexyl-	25	-21.0	0
			100	58.2	III
			200	77.6	IV
417	*31670	Succinimide, N-isobutyl-	25	-23.4	0
			100	4.2	I
			200	13.2	I
418	*31671	Succinimide, N-isopropyl-	25	-34.9	0
			100	-41.0	0
			200	-39.3	0
419	*31797	Succinimide, N-isopropyl-2-(1,1,3,5-tetramethyl-2-octenyl)-	25	-7.1	0
			100	34.6	II
			200	34.9	II
420	4133	Succinimide, N-octyl-	25	33.4	II
			100	70.7	IV
			200	76.8	IV

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
421	*31677	Succinimide, N-phenethyl-	25	4.2	I
			100	33.2	II
			200	42.3	III
422	25209	Sulfoxide, allyl octyl	25	-6.8	0
			100	36.0	II
			200	41.6	III
423	396	Tartaric acid, dibutyl ester	25	8.7	I
			100	8.6	I
			200	27.4	II
424	3572	Tartaric acid, diisopropyl ester	25	-9.6	0
			100	-27.4	0
			200	-15.1	0
425	6	Thiocyanic acid, 2-(2-butoxyethoxy)ethyl ester	10	8.1	I
426	120	Thymol, chloro-	25	-5.4	0
			100	16.5	I
			200	22.0	II
427	5783	Tiglic acid, phenethyl ester	25	19.3	I
			100	12.4	I
			200	32.4	II
428	*20218	m-Toluamide, N,N-diethyl-	25	8.4	I
			100	21.7	II
			200	8.5	I
429	*20217	o-Toluamide, N,N-diethyl-	25	3.9	I
			100	20.1	II
			200	21.4	II
430	*20219	p-Toluamide, N,N-diethyl-	25	4.6	I
			100	3.9	I
			200	30.8	II
431	15625	o-Toluic acid	25	19.6	I
			100	5.1	I
			200	13.6	I
432	26183	m-Toluidine, 6-chloro-alpha, alpha, alpha-trifluoro-	25	-8.7	0
			100	-3.9	0
			200	-4.9	0
433	26186	p-Toluidine, alpha, alpha, alpha-trifluoro-2-nitro-	25	32.6	II
			100	73.5	IV
			200	79.9	IV

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
434	4861	"Tonkene F" (chemical name unknown)	25	8.2	I
			50	26.6	II
			100	41.6	III
			200	39.8	II
435	2199	Tropic acid, ethyl ester	25	-10.2	0
			100	-27.3	0
			200	-34.8	0
436	4987	5,9-Undecadien-2-one, 6,10-dimethyl-	25	3.6	I
			100	-2.1	0
			200	11.3	I
437	3937	2-Undecanol, 6,10-dimethyl-	25	7.4	I
			100	4.9	I
			200	14.1	I
438	*7784	9-Undecenoic acid, 2,2,2-trichloro-1,1-dimethyl= ethyl ester	25	-0.6	0
			100	30.6	II
			200	42.3	III
439	2065	10-Undecenoic acid	25	36.6	II
			100	57.1	III
			200	52.2	III
440	*6259	10-Undecen-1-ol	25	-32.2	0
			100	2.2	I
			200	-9.7	0
441	*6601	Valeramide, 3-hydroxy-3-methyl-N,N-dipropyl-	25	5.4	I
			100	15.8	I
			200	19.4	I
442	*2945	Valeric acid, phenethyl ester	25	9.7	I
			100	8.2	I
			200	24.3	II
443	93	Vanillin	25	5.6	I
			50	-1.8	0
			100	17.4	I
			200	28.8	II
444	76	o-Vanillin	25	0.1	I
			100	37.7	II
			200	41.6	III
445	2809	Wood distillate fraction, 2-hydroxyethyl ether	25	10.1	I
			100	25.5	II
			200	35.7	II
446	3122	Wood tar distillate, soluble	25	24.4	II
			100	22.0	II
			200	31.0	II

Item No.	Ent-No.[1]	Chemical name	Deposit (Mg./sq. ft.)	Repellency	
				Percent	Class
447	3123	Wood tar distillate, soluble	10	21.2	II
			25	-10.8	0
			100	4.7	I
			200	9.0	I
448	24558	2,6-Xylenol, 4-chloro-	25	-43.3	0
			100	-5.2	0
			200	3.4	I
449	1553	3,5-Xylenol	25	5.6	I
			100	19.4	I
			200	21.6	II
450	3562	Xylitol, pentapropionate	25	21.0	II
			100	33.3	II
			200	30.9	II

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6	425	667	136	1769	302	2577	45
62	349	671	29	1787	301	2617	354
76	444	680	33	1788	300	2638	386
78	342	744	328	1800	231	2702	234
93	443	748	305	1803	82	2718	332
101	143	753	142	1805	94	2719	330
104	242	773	217	1826	202	2761	203
120	426	786	49	1854	153	2809	445
126	339	892	275	1954	207	2819	304
145	338	893	34	1966	93	2832	8
147	370	944	107	2060	1	2864	139
152	149	949	140	2064	92	2879	288
157	341	968	293	2065	439	2886	27
164	215	1015	5	2075	397	2913	84
165	216	1016	73	2103	331	2941	42
170	208	1023	166	2199	435	2945	442
189	39	1029	19	2225	209	2954	110
206	244	1031	54	2242	23	3056	272
227	21	1045	9	2269	103	3077	327
229	36	1089	232	2321	294	3122	446
283	351	1122	340	2359	404	3123	447
299	381	1170	41	2383	135	3130	283
300	211	1393	361	2384	137	3166	287
301	213	1394	357	2392	38	3190	' 26
337	297	1395	365	2396	364	3248	396
374	378	1396	360	2418	355	3301	239
396	423	1397	359	2419	356	3341	12
431	167	1462	72	2420	362	3343	306
459	343	1487	243	2421	363	3346	350
463	322	1514	120	2422	358	3358	375
483	402	1535	345	2467	253	3368	384
488	97	1553	449	2518	329	3395	210
509	10	1633	407	2525	89	3451	348
523	91	1650	290	2531	296	3554	373
630	323	1654	289	2540	16	3562	450
666	412	1656	205	2576	46	3572	424

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3597	219	5024	192	5963	255	6535	173
3598	220	5027	197	5992	276	6548	198
3864	285	5032	195	6047	146	6551	248
3926	295	5037	374	6052	30	6563	259
3937	437	5078	193	6075	37	6571	199
3945	277	5085	95	6094	265	6579	382
3957	152	5088	406	6106	267	6581	401
3996	403	5096	133	6107	35	6596	178
4003	70	5102	191	6133	155	6597	185
4025	298	5511	168	6139	180	6601	441
4093	169	5518	53	6152	111	7014	334
4133	420	5520	44	6156	237	7035	310
4162	318	5521	100	6169	266	7048	154
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4201	372	5529	278	6204	309	7150	172
4234	284	5534	236	6210	268	7179	324
4265	376	5540	238	6225	151	7227	114
4296	292	5550	366	6231	18	7289	170
4318	15	5616	336	6236	164	7353	204
4322	14	5684	48	6245	408	7369	175
4337	214	5698	325	6251	411	7388	251
4339	252	5719	393	6252	410	7395	176
4343	13	5723	187	6259	440	7404	250
4369	71	5757	99	6270	148	7425	194
4476	315	5768	51	6287	145	7555	261
4723	229	5783	427	6310	388	7694	190
4790	319	5785	353	6317	390	7705	7
4861	434	5794	385	6319	389	7784	438
4869	352	5824	316	6375	245	8090	90
4900	271	5838	263	6383	371	8105	270
4923	179	5853	109	6387	256	8109	101
4987	436	5854	112	6388	409	8298	104
5002	405	5868	50	6435	279	8439	314
5003	25	5870	281	6483	181	8440	313
5007	96	5877	320	6494	156	8906	52
5012	141	5889	333	6499	249	9221	221
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